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**IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF CALIFORNIA  
SAN FRANCISCO DIVISION**

ONSHORE NETWORKS OF ILLINOIS,  
L.L.C. (D/B/A ONSHORE NETWORKS,  
L.L.C.), on behalf of itself and all others  
similarly situated,  
Plaintiff,

vs.

MICRON TECHNOLOGY, INC., MICRON  
SEMICONDUCTOR PRODUCTS, INC.,  
SAMSUNG ELECTRONICS CO., LTD.,  
SAMSUNG SEMICONDUCTOR, INC., SK  
HYNIX, INC. (F/K/A HYNIX  
SEMICONDUCTOR, INC.), SK HYNIX  
AMERICA, INC. (F/K/A HYNIX  
SEMICONDUCTOR AMERICA, INC.),  
Defendants.

Case No. 3:18-cv-03905

**CLASS ACTION COMPLAINT FOR  
VIOLATIONS OF FEDERAL  
ANTITRUST LAWS**

**JURY TRIAL DEMANDED**

1 Plaintiff onShore Networks of Illinois, L.L.C. (d/b/a onShore Networks, L.L.C.)  
2 (hereinafter, “onShore” or “Plaintiff”), on behalf of itself and a proposed class of direct  
3 purchasers of Dynamic Random Access Memory chips or modules (“DRAM”) brings this action  
4 against Defendants for damages, injunctive relief and other relief pursuant to federal antitrust  
5 laws. This Complaint is based upon personal knowledge with respect to Plaintiff’s own acts and  
6 upon information and belief, formed after reasonable inquiry, including the investigation of  
7 counsel.

8 **I. NATURE OF THE CASE**

9 1. This lawsuit arises out of a contract, combination and conspiracy among  
10 Defendants and their co-conspirators to fix, raise, stabilize, and maintain the prices of DRAM  
11 sold by Defendants and their affiliates during the period from approximately June 1, 2016  
12 through February 1, 2018 (the “Class Period”).

13 2. DRAM is a type of random access memory (“RAM”) that is used in most  
14 computerized devices, such as personal computers, servers, and cellular phones.

15 3. DRAM is a computer’s main volatile memory. It resides in modules inserted into  
16 the motherboard and is the most commonly used type of RAM in electronic consumer and  
17 industrial devices.

18 4. Defendants Micron Technology, Inc., Micron Semiconductor Products, Inc.,  
19 Samsung Electronics Co., Ltd., Samsung Semiconductor, Inc., SK Hynix, Inc. (f/k/a Hynix  
20 Semiconductor, Inc.), and SK Hynix America, Inc. (f/k/a Hynix Semiconductor America, Inc.),  
21 collectively account for over 95% of DRAM market share worldwide.

22 5. As described more fully below, from early 2016 through at least February 1,  
23 2018, the Defendants combined and conspired to fix and raise the prices at which they sold  
24 DRAM in the United States. Defendants were able to coordinate, facilitate, and monitor such a  
25 conspiracy by publicly announcing their intentions to cut or limit DRAM supplies, despite a  
26 steady increase in demand. Defendants further took advantage of the concentrated DRAM

1 market and its high barriers to entry in facilitating the conspiracy. As a result of the conspiracy,  
2 DRAM prices rose on average more than 300% during the Class Period.

3 6. As a direct result of the anticompetitive and unlawful conduct alleged herein,  
4 Plaintiff and the Class paid artificially inflated prices for DRAM during the Class Period and  
5 have thereby suffered antitrust injury to their business or property. Such prices exceeded the  
6 amount that they would have paid if the price for DRAM had been determined by a competitive  
7 market.

## 8 **II. JURISDICTION AND VENUE**

9 7. Plaintiff brings this action to obtain injunctive relief and to recover damages,  
10 including treble damages, and costs of suit and reasonable attorneys' fees, resulting from  
11 Defendants' violation of the Sherman Act, 15 U.S.C. § 1.

12 8. The Court has jurisdiction over the subject matter of this action pursuant to  
13 Sections 4(a) and 16 of the Clayton Act, 15 U.S.C. § 22, and 28 U.S.C. § 1391(b), (c), and (d)  
14 because a substantial part of the events giving rise to Plaintiff's claims occurred in this District, a  
15 substantial portion of the affected interstate trade and commerce discussed below has been  
16 carried out in this District, and one or more of the Defendants reside in this district.

17 9. This Court has personal jurisdiction over each of the Defendants because each  
18 Defendant, either directly or through the ownership or control of its United States subsidiaries:  
19 (a) transacted business in the United States, including in this District; (b) directly or indirectly  
20 sold or marketed substantial quantities of DRAM chips and modules throughout the United  
21 States, including in this District; (c) had substantial aggregate contacts with the United States as  
22 a whole, including in this District; or (d) was engaged in an illegal price-fixing conspiracy that  
23 was directed at, and had a direct, substantial, and reasonably foreseeable and intended effect of  
24 causing injury to, the business or property of persons and entities residing in, located in, or doing  
25 business throughout the United states, including in this District. Defendants conduct business  
26 throughout the United States, including in this District, and they have purposefully availed  
27 themselves of the laws of the United States.

10. Defendants engaged in conduct both inside and outside of the United States that caused direct, substantial, and reasonably foreseeable and intended anticompetitive effects upon interstate commerce within the United States.

11. By virtue of their nationwide contacts and activities, Defendants are subject to the jurisdiction of this Court. Alternatively, there is jurisdiction over the foreign Defendants pursuant to Federal Rule of Civil Procedure 4(k)(2).

### **III. INTERSTATE TRADE AND COMMERCE**

12. Defendants' conduct, as described in this Complaint, was within the flow of, was intended to, and did have a substantial effect on, the interstate commerce of the United States, including this District.

13. During the Class Period, Defendants manufactured, sold and shipped DRAM chips and modules in a continuous and uninterrupted flow of interstate commerce. Defendants' price-fixing conspiracy had a direct, substantial and reasonably foreseeable effect on interstate commerce in the United States.

### **IV. PARTIES**

#### **A. Plaintiff**

14. Plaintiff onShore Networks of Illinois, L.L.C. (d/b/a onShore Networks, L.L.C.) is an Illinois corporation with its principal place of business in Chicago, Illinois. Plaintiff purchased DRAM directly from one or more Defendants during the Class Period.

#### **B. Defendants**

15. Defendant Micron Technology, Inc. ("Micron Technology") is a Delaware corporation with its principal place of business at 8000 South Federal Way, Boise, Idaho. During the Class Period, Micron Technology manufactured, sold, and distributed DRAM throughout the United States.

16. Defendant Micron Semiconductor Products, Inc. ("Micron Semiconductor") is an Idaho corporation with its principal place of business at 8000 South Federal Way, Boise, Idaho. Micron Semiconductor is a wholly owned and controlled subsidiary of Micron Technology.

1 During the Class Period, Micron Semiconductor manufactured, sold, and distributed DRAM to  
2 customers throughout the United States, including sales of DRAM through its retailing arm,  
3 Crucial Technology, Inc. (“Crucial”), and Crucial’s website, Crucial.com.

4 17. Defendants Micron Technology, Micron Semiconductor, and Crucial, are  
5 collectively referred to herein as “Micron.”

6 18. Defendant Samsung Electronics Co., Ltd. (“Samsung Electronics”) is a Korean  
7 corporation and maintains its executive offices at 129, Samsung-ro, Yeongtong-gu, Suwon-si,  
8 Gyeonggi-do, Korea. During the Class Period, Samsung Electronics manufactured, sold, and  
9 distributed DRAM worldwide, including in the United States.

10 19. Defendant Samsung Semiconductor, Inc. (“Samsung Semiconductor”) is a  
11 California corporation located at 3655 North First Street, San Jose, California 95134. Samsung  
12 Semiconductor is a wholly owned and controlled subsidiary of Samsung Electronics. During the  
13 Class Period, Samsung Semiconductor sold and distributed DRAM throughout the United States.

14 20. Defendants Samsung Electronics and Samsung Semiconductor are collectively  
15 referred to herein as “Samsung.”

16 21. Defendant SK Hynix, Inc. (f/k/a Hynix Semiconductor, Inc.) (“Hynix Korea”)   
17 maintains its head offices at 2091, Gyeongchung-daero, Bubal-eub, Icheon-si, Gyeonggi-do,  
18 Korea. During the Class Period, Hynix Korea manufactured, sold and distributed DRAM  
19 worldwide, including in the United States.

20 22. Defendant SK Hynix America, Inc. (f/k/a Hynix Semiconductor America, Inc.)  
21 (“Hynix America”) is a California corporation located at 3101 North First Street, San Jose,  
22 California 95134. Hynix America is a wholly owned and controlled subsidiary of Hynix Korea.  
23 During the Class Period, Hynix America sold and distributed DRAM throughout the United  
24 States.

25 23. Defendants Hynix Korea and Hynix America are collectively referred to herein as  
26 “Hynix.”

27 24. Defendants Samsung Electronics and Hynix Korea, as identified above, are at

1 times collectively referred to herein as the “Korean Defendants.”

2 25. Defendants Micron, Samsung Semiconductor, and Hynix America, as identified  
3 above, are at times collectively referred to herein as the “US Defendants.”

4 **C. Defendants’ Co-Conspirators and Agents**

5 26. The acts alleged in this Complaint to have been done by Micron, Samsung, and  
6 Hynix, were authorized, ordered, and condoned by their parent companies and the acts alleged to  
7 have been done by each Defendant were authorized, ordered, and performed by their officers,  
8 directors, agents, employees, or representatives while engaged in the management, direction,  
9 control, or transaction of their business affairs.

10 27. Various persons or firms not named as Defendants have participated as co-  
11 conspirators in the violations alleged herein and have performed acts and made statements in  
12 furtherance thereof. The Defendants are jointly and severally liable for the acts of their co-  
13 conspirators regardless of whether or not the co-conspirators are named in this Complaint.

14 28. Each Defendant acted as the agent or joint venture of or for other Defendants with  
15 respect to the acts, violations, and common course of conduct alleged herein.

16 **V. CLASS ACTION ALLEGATIONS**

17 29. Plaintiff brings this action both on behalf of itself and all other similarly situated  
18 individuals and entities (the “Class”) pursuant to Federal Rules of Civil Procedure 23(a),  
19 23(b)(2) and (b)(3). The Class is defined as follows:

20 All individuals and entities who or that purchased DRAM in the United  
21 States directly from one or more Defendants or their co-conspirators  
22 (or their controlled subsidiaries, affiliates, or joint ventures) from June  
1, 2016 through February 1, 2018.

23 30. Plaintiff does not know the exact number of Class members, such information  
24 being in the exclusive control of Defendants. Due to the nature of the trade and commerce  
25 involved, however, Plaintiff believes that the Class is so numerous and geographically dispersed  
26 throughout the United States that joinder of all Class members is impracticable.

27 31. There are questions of law or fact common to the Class, including, but not limited

1 to, the following:

- 2 i. Whether Defendants engaged in a contract, combination, or conspiracy to
- 3 fix, raise, maintain, or stabilize prices of DRAM sold in the United States;
- 4 ii. The identity of the participants of the alleged conspiracy;
- 5 iii. The duration of the alleged conspiracy and the acts carried out by
- 6 Defendants and their co-conspirators in the furtherance of the conspiracy;
- 7 iv. Whether the alleged conspiracy violated Section 1 of the Sherman Act;
- 8 v. Whether the contract, combination, or conspiracy caused DRAM prices to
- 9 be higher than they would have been in the absence of Defendants'
- 10 conduct;
- 11 vi. Whether the conduct of Defendants and their co-conspirators, as alleged in
- 12 this Complaint, caused injury to the business or property of Plaintiff and
- 13 the other Class members;
- 14 vii. Whether the Defendants and their co-conspirators fraudulently concealed
- 15 the conspiracy's existence from the Plaintiff and other Class members;
- 16 viii. Whether Plaintiff and other Class members are entitled to injunctive relief,
- 17 and, if so, the nature and extent of such relief; and
- 18 ix. The appropriate class-wide measure of damages.

19 32. These and other questions of law and fact are common to the Class and  
 20 predominate over any questions affecting only individual Class members.

21 33. Plaintiff's claims are typical of the claims of the Class because Plaintiff directly  
 22 purchased DRAM from a defendant or co-conspirator, all Class members were damaged by the  
 23 same conspiracy alleged herein, and the relief sought by Plaintiff is common to the Class.

24 34. Plaintiff will fairly and adequately represent the interests of the Class in that  
 25 Plaintiff is a direct purchaser of DRAM and has no conflict with any other members of the Class.  
 26 Furthermore, Plaintiff has retained competent counsel experienced in antitrust class actions and  
 27 other complex litigation.

1           35. Defendants have acted on grounds generally applicable to the Class, thereby  
2 making injunctive relief appropriate with respect to the Class as a whole.

3           36. A class action is superior to the alternatives, if any, for the fair and efficient  
4 adjudication of this controversy. Prosecution of this matter as a class action will eliminate the  
5 possibility of repetitive litigation and there are no inherent barriers to managing the case as a  
6 class action.

7           37. The prosecution of separate actions by individual Class members would create the  
8 risk of inconsistent or varying outcomes.

9           38. The Class is also readily definable and is one for which records likely exist in the  
10 files of Defendants.

## 11 **VI. INDUSTRY BACKGROUND**

### 12 **A. DRAM Introduction**

13           39. Random access memory, more commonly known as RAM, is the physical  
14 hardware inside a computer or computerized electronic device that temporarily stores data,  
15 serving as the computer's "working" memory, and works in conjunction with a computer's hard  
16 drive. *See* Figure 1. RAM is used in computerized electronic devices, such as personal  
17 computers, cellphones, servers, and workstations. The purpose of RAM is to provide quick read  
18 and write access to a storage device. Using RAM to store, and then access or re-access data is  
19 much quicker than storing and accessing that same data on hard drives, which needs to be  
20 physically spun to be read. Effectively, RAM is a component of a computer or computerized  
21 device that allows quick access to stored data, though the data is stored only temporarily—RAM  
22 requires constant power to keep the data accessible. Therefore, if a computer or device is  
23 shutdown or turned off, all data within RAM is lost. Because data stored in RAM is temporary,  
24 RAM is categorized as "volatile memory."

25  
26  
27



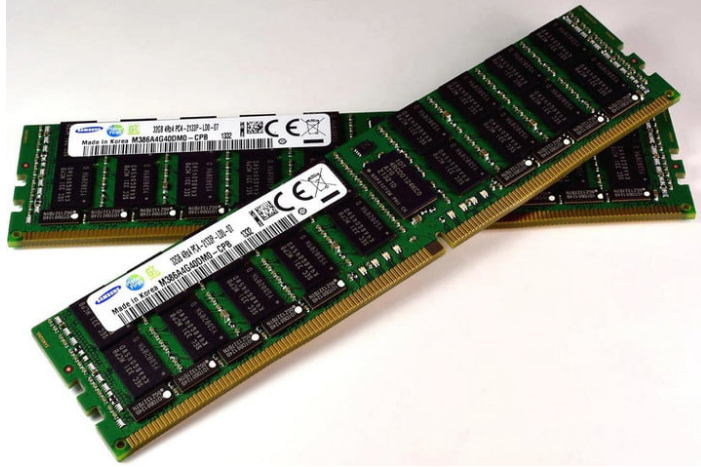


Figure 1

40. Dynamic random access memory, or DRAM, is one the most commonly used types of RAM modules used in a wide range of electronic applications, such as personal computers, cellphones, servers and workstations. *See* Figure 2. DRAM stores information in a cell containing a capacitor and transistor. Because of this design, those cells must be refreshed with new electricity/power every few milliseconds for the memory to keep holding its data.

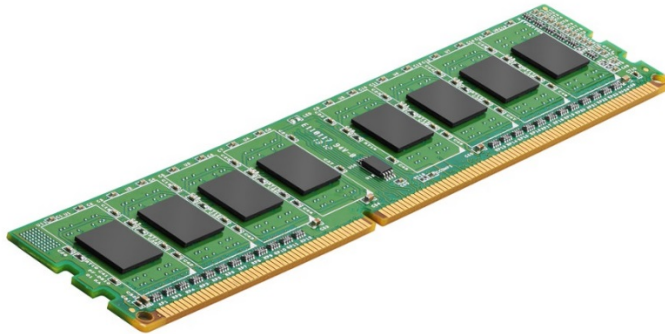


Figure 2

41. DRAM is a stand-alone product. In other words, DRAM must be used or paired with a computerized electronic device, such as personal computers, cellphones, workstations, and servers, to serve any function.

42. Because DRAM has no independent utility, the value of, and thus, demand for

DRAM is driven by the demand for products that need volatile memory.

**B. The DRAM Industry is Conducive to Collusion**

43. The structure of the DRAM market makes it particularly conducive to price fixing and market allocation. The DRAM market exhibits many of the qualities that facilitate collusion, including: (1) substantial barriers to entry; (2) high market concentration; (3) inelastic demand; (4) homogeneous or commoditized products; and (5) opportunities to conspire. Together, these characteristics vastly increase the feasibility of anticompetitive conduct in the DRAM market.

**i. High Barriers to Entry in the DRAM Market Make the Industry Susceptible to Collusion.**

44. A collusive arrangement that raises product prices above competitive levels would, under normal circumstances, attract new entrants to the market. Where there are significant barriers to entry, however, new entrants are less likely. High barriers to entry have prevented new entrants into the worldwide DRAM market, and especially in the United States.

45. There are substantial barriers to entry in the DRAM market. A new entrant in this market faces significant startup costs, which include investments in plants, machinery, distribution infrastructure, access to patented technology that is mostly held by Defendants, a skilled labor and sales force, and research and development. Strong pre-existing relationships between market players create an additional deterrent to potential new entrants. Thus, there are substantial barriers to entry that preclude, reduce or make it difficult for new entrants to enter into the DRAM market.

**ii. Sales of DRAM in the United States are Conducive to Collusion Because They are Controlled by a Limited Number of Manufacturers.**

46. Micron, Samsung, and Hynix accounted for approximately ninety-two percent (92%) of the worldwide DRAM market in 2016, more than ninety-five (95%) of the worldwide DRAM market in 2017 and in the first quarter of 2018. *See* Figure 3.

| <i><b>Defendant<br/>Manufacturer</b></i> | <i><b>Market Share,<br/>Q4 2016</b></i> | <i><b>Market Share,<br/>Q4 2017</b></i> | <i><b>Market Share,<br/>Q1 2018</b></i> |
|--|---|---|---|
| <b>Micron</b>                            | 19.4%                                   | 20.8%                                   | 22.6%                                   |
| <b>Samsung</b>                           | 47.5%                                   | 46.0%                                   | 44.9%                                   |
| <b>Hynix</b>                             | 26.7%                                   | 28.7%                                   | 27.9%                                   |
| <b>Nanya</b>                             | 3.1%                                    | 2.5%                                    | 2.8%                                    |
| <b>Winbond</b>                           | 1.3%                                    | 0.8%                                    | 0.8%                                    |
| <b>Powerchip</b>                         | 0.8%                                    | 0.5%                                    | 0.5%                                    |
| <b>Others</b>                            | 1.1%                                    | 0.7%                                    | 0.6%                                    |

Source: DRAmEXchange.

Figure 3

47. The Herfindahl-Hirschman Index (HHI) is a commonly accepted measure of market concentration. The United States Department of Justice considers markets in between 1,500 to 2,500 to be moderately concentrated whereas anything in excess of 2,500 points is considered highly concentrated. The DRAM market HHI was over 3,300 at the end of 2016 and 2017, and was over 3,200 by the end of the first quarter 2018.

48. This highly concentrated market, especially one in which the three largest firms controls approximately 95% of the total market, facilitated the conspiracy because a potential cartel would need only to conspire with, and police, a limited number of firms to be successful. Because Defendants owned and controlled approximately 95% of the worldwide DRAM market, they collectively have the market power to impose and sustain conspiracy described herein.

### **iii. Inelastic Demand in the DRAM Market Makes the Industry Susceptible to Collusion**

49. Where a seller of goods or services can increase prices without suffering a substantial reduction in demand, pricing is considered inelastic. Price inelasticity facilitates collusion, allowing producers to raise their prices collectively without triggering sufficient

1 customer substitution to alternative products that could make the conspiratorial prices  
2 unprofitable.

3 50. Demand for DRAM is highly inelastic because there are no close substitutes for  
4 DRAM products. Because DRAM has no close substitute products, demand for DRAM—the  
5 established volatile memory technology—will continue to rise as new products and technologies,  
6 such as computers, servers, and cellphones. As the established memory technology, OEMs have  
7 spent years developing their products to be configurable with DRAM. Accordingly, purchasers  
8 of DRAM have no choice but to be dependent on DRAM manufacturers.

9 51. Consumers have recognized that DRAM is a commodity product. For instance, a  
10 Forbes article writes, “because device manufacturers [direct purchaser OEMs] need a certain  
11 amount of DRAM to meet performance requirements for systems that they may have worked on  
12 developing several quarters ago. ... This forces companies to buy DRAM irrespective of higher  
13 prices, without being able to meaningfully scale back.”

14 52. A hypothetical small but significant increase in the price of DRAM by a cartel  
15 would not cause a significant, if any, number of purchasers to utilize other materials or  
16 technology in lieu of DRAM, nor would such a hypothetical price increase cause so much  
17 switching to other products that the increase would be unprofitable.

18 53. Both Defendants and consumers recognize the inelasticity of the DRAM market.  
19 For instance, Micron’s CFO stated during a December 2017 investor presentation, “there is a  
20 general belief that the industry participants are keenly aware of the fact that the DRAM market is  
21 relatively inelastic.”

22 **iv. DRAM is a Commodity Product**

23 54. DRAM is a commodity, and DRAM prices have been described as “largely  
24 governed by demand and supply factors.” IC Insights, a market research company, states that  
25 “DRAM is usually considered a commodity like oil.”

26 55. Technology manufacturers have also recognized DRAM as a commodity product.  
27 In a DRAM operation manual, IBM provides that “[a]lthough [DRAM] are produced in many

1 sizes and sold in a variety of packages, their overall operation is essentially the same.”

2 56. Because DRAM is a commodity and prices are highly inelastic, Defendants were  
3 able to collectively raise prices to supra-competitive levels without losing revenues.

4 **v. Defendants’ Increased Prices for DRAM Products Cannot Be**  
5 **Explained by Market Factors**

6 57. DRAM is made primarily from semiconductor silicon wafers. Therefore, to  
7 manufacturer DRAM, Defendants must purchase raw silicon wafers. However, while silicon  
8 wafer prices have remained relatively stable between 2011 through 2017, DRAM prices rose  
9 dramatically during the Class Period.

10 58. During the Class Period, research and development costs, as well as capital  
11 expenditure costs for Defendants to manufacture and produce DRAM have also remained  
12 relatively stable.

13 59. Despite the relatively stable materials and research and development costs,  
14 DRAM prices increased by over 300% during the Class Period. *See, e.g.*, Figure 4.

DDR4 4Gb Avg. Spot Price

|      |    |      |
|------|----|------|
| 2016 | 1  | 2.15 |
|      | 2  | 1.94 |
|      | 3  | 1.70 |
|      | 4  | 1.64 |
|      | 5  | 1.52 |
|      | 6  | 1.51 |
|      | 7  | 1.76 |
|      | 8  | 1.86 |
|      | 9  | 1.93 |
|      | 10 | 2.40 |
|      | 11 | 2.53 |
|      | 12 | 2.76 |
| 2017 | 1  | 3.15 |
|      | 2  | 3.43 |
|      | 3  | 3.43 |
|      | 4  | 3.35 |
|      | 5  | 3.23 |
|      | 6  | 3.24 |
|      | 7  | 3.45 |
|      | 8  | 3.57 |
|      | 9  | 3.86 |
|      | 10 | 4.71 |
|      | 11 | 4.81 |

Source: DRAMeXchange, Nov., 2017

Figure 4

60. The dramatic price increase during the Class Period also cannot be explained by technological product advancements or performance benefits. The most recent generation of DRAM, DDR4, was released to the market in the second quarter of 2014. DDR4, along with its predecessor, DDR3, made up approximately 97% of the worldwide DRAM market in 2016 and 2017.

61. Since its introduction into the market in 2014, DDR4 has steadily risen in popularity and use by consumers due to its higher clock speeds and lower voltage consumption. For instance, in 2014 DDR4 comprised of 4% of the worldwide DRAM market, in 2015 DDR4 rose to 20%, in 2016 DDR4 increased to 45%, and in 2017 DDR4 grew to 58%. However, since DDR3's release in 2007, and DDR4's release in 2014, neither generation of DRAM has been subject to technological advancements or developments that justify the significant price increases during the Class Period. Therefore, the drastic DRAM price increases during the Class Period cannot be explained by advancement in DRAM technology.

**vi. The Defendants' Profits Increased During the Class Period**

62. During the Class Period, as DRAM prices drastically increased, Defendants' profits and revenues also significantly increased. Defendants' worldwide DRAM revenues skyrocketed from the first quarter of 2016, just before the Class Period, to the first quarter of 2018, the end of the conspiracy. Micron's worldwide DRAM revenues increased more than 322%, from \$1.58 to \$5.2 billion. Samsung's worldwide DRAM revenues increased more than 260%, from \$3.97 billion to \$10.36 billion. Hynix's worldwide DRAM revenues increased more than 277%, from \$2.3 billion to \$6.4 billion. See Figure 5.

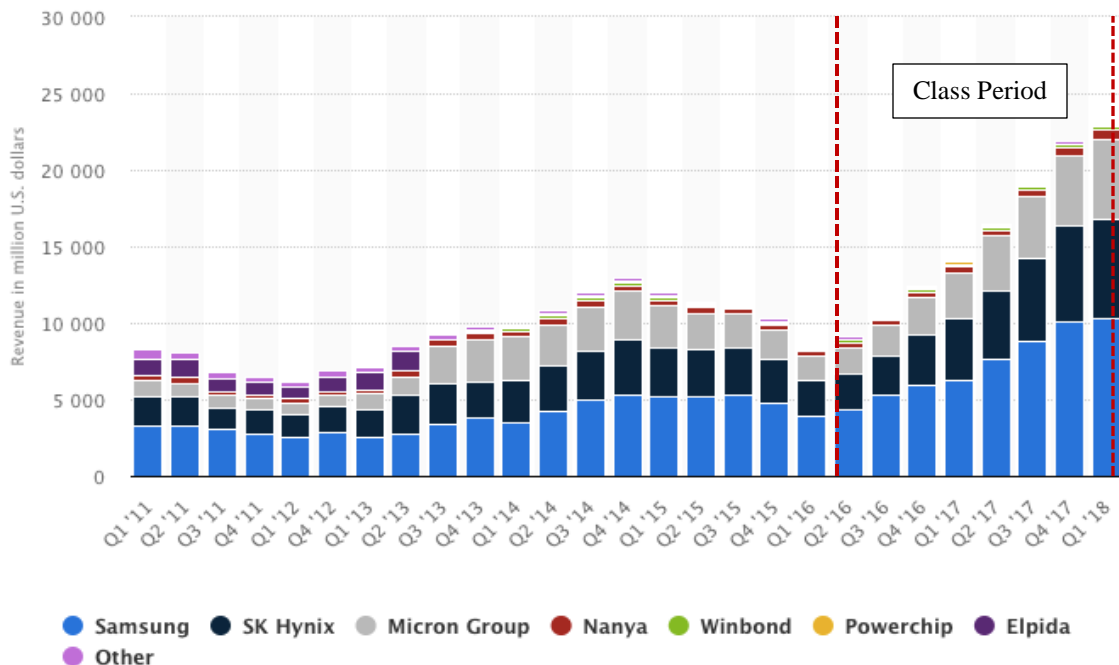


Figure 5

Source: Statistica.com.

**vii. The Defendants Had Many Opportunities to Collude**

63. Because the DRAM and semiconductor industry is concentrated and has relatively few member companies, there are several large industry organizations that cater to the manufacturers. These industry organizations host regular events and conferences for their members, which allowed opportunities for collusion among Defendants and facilitated the conspiracy.

64. The Semiconductor Industry Association (“SIA”), according to their website, “is the voice of the U.S. semiconductor industry.” SIA’s leadership and its board of directors are entirely made up of industry executives. For instance, Sanjay Mehrotra, President and CEO of Micron Technology, is listed as the 2018 SIA Vice Chair. Micron, Samsung and Hynix are all members of SIA.

65. SIA hosts conferences, meetings, and various events, such as their “Annual Award Dinner” throughout the year. For instance, SIA’s 2016 Annual Award Dinner was held on November 10, 2016, and SIA’s 2017 Annual Award Dinner was held on November 14, 2017, where Mark Durcan, former Micron CEO, was a featured 2017 award winner. These SIA events and meetings provided opportunities for social interaction or side conversations among Micron, Samsung, and Hynix that further facilitated the conspiracy.

66. The Korean Semiconductor Industry Association (“KSIA”) is a small, private Korean semiconductor industry organization. Samsung and Hynix are listed as members of KSIA, and in March 2016, Sung-Wook Park, CEO and Vice Chairman of Hynix, was inducted as the President of the KSIA. Jin Kyoung Young, President of Samsung Electronics, is KSIA’s Vice Chairman.

67. Throughout the year, KSIA hosts various events and meetings for its members. These KSIA events provided opportunities for social interaction or side conversations among the Defendants.

68. The World Semiconductor Council (“WSC”) is an international semiconductor industry organization “that brings together industry leaders to address issues of global concern to the semiconductor industry.” The WSC lists that it seeks to “promote international cooperation in the semiconductor sector in order to facilitate the healthy growth of the industry from a long-term, global prospective.” The WSC holds various annual events and conferences, such as its World Semiconductor Council Meeting for members held in April 2018 in Coronado, California. The conference was led by Sung Wook Park, CEO of Hynix. These WSC events provided opportunities for social interaction or side conversation among the Defendants.



69. The World Semiconductor Trade Statistics Organization (“WSTS”) touts itself as “the world’s leader in global semiconductor market statistics.” According to its website, “Fifty-five companies throughout the world...are members.” Micron, Samsung, and Hynix are WSTS members.

70. The WSTS holds annual events and meetings for its members, such as board of director meetings, executive committee meetings, committee meetings, and regional chapter meetings. These WSTS events provided opportunities for social interaction or side conversation among the Defendants.

71. The Global Semiconductor Alliance’s (“GSA”) mission “is to accelerate the growth and increase the return on invested capital of the global semiconductor industry by fostering a more effective ecosystem through collaboration, integration and innovation.” GSA members “include companies throughout the supply chain representing 30 countries worldwide,” including Micron, Samsung, and Hynix. Dr. Joo Sun Choi, President of Samsung Device Solutions Americas, and Brian Shirley, Micron’s Senior Vice President of DRAM & Emerging Memory Engineering, are both serving on the GSA board of directors. Dr. Sung-Wook Park, President and CEO of Hynix, currently serves on GSA’s Asia-Pacific Leadership Council. GSA regularly hosts various events and conferences for its leadership, board of directors, and members. These events provided opportunities for social interaction or side conversation among the Defendants.

**viii. The Defendants Have a History of Collusive Behavior in the DRAM Market**

72. The Defendants have engaged in past anticompetitive behavior similar to that alleged herein.

73. In 2002, the DOJ began an antitrust investigation into the activities of DRAM manufacturers, Micron, Samsung, Hynix, Infineon Technologies AG, and Elpida Memory, Inc. The five manufacturer defendants all pled guilty to their involvement and participation in the DRAM price-fixing conspiracy. In total, members of the cartel were fined by the DOJ more than

1 \$730 million.

2 74. In December 2003, Micron executive Alfred P. Censullo pled guilty to  
3 “obstructing the grand jury investigation of a suspected conspiracy to fix the price of [DRAM]  
4 products sold in the United States.”

5 75. In May 2005, Hynix pled guilty to its involvement and participation in the DRAM  
6 conspiracy, and agreed to pay a \$185 million criminal fine.

7 76. Additionally, four Hynix executives pled guilty their roles in the conspiracy. D.S.  
8 Kim, general manager of worldwide sales and marketing was sentenced to eight months in  
9 prison. C.K. Chung, director of global strategic account sales, was sentenced to seven months in  
10 prison. K.C. Suh, senior manager of memory product marketing, was sentenced to six months in  
11 prison. C.Y. Choi, general manager of marketing and sales support, was sentenced to five  
12 months in prison. The executives were also each fined \$250,000.

13 77. Samsung was charged with “carrying out the conspiracy by: Participating in  
14 meetings, conversations, and communications in the United States and elsewhere with  
15 competitors to discuss the prices of DRAM to be sold to certain customers; Agreeing, during  
16 those meetings, conversations, and communications, to charge prices of DRAM at certain levels  
17 to be sold to certain customers; Issuing price quotations in accordance with the agreements  
18 reached; and Exchanging information on sales of DRAM to certain customers for the purpose of  
19 monitoring and enforcing adherence to the agreed-upon prices.” In October 2005, Samsung pled  
20 guilty and paid a \$300 million criminal fine.

21 78. Several Samsung executives and employees pled guilty for their personal  
22 involvement in the conspiracy. Il Ung Kim, Samsung Electronics executive, pled guilty and was  
23 sentenced to serve 14 months in prison and to pay a \$250,000 criminal fine. Young Hwan Park,  
24 Samsung Semiconductor President, pled guilty and was sentenced to serve 10 months in prison  
25 and to pay a \$250,000 criminal fine. Sun Woo Lee, Samsung’s senior manager of DRAM sales,  
26 pled guilty and was sentenced to serve eight months in prison and to pay a \$250,000 criminal  
27 fine. Yeongho Kang, associate director of DRAM marketing, was sentenced to serve seven

months in prison and to pay a \$250,000 fine. Young Woo Lee, sales director for Samsung's German division, was sentenced to serve seven months in prison and to pay a \$250,000 fine.

79. Antitrust regulators in other jurisdictions and countries also prosecuted the defendants for their roles in the conspiracy. The European Commission investigated and prosecuted the defendants, and Samsung was fined €145,728,000, and Hynix was fined €1,471,000. Micron was granted full immunity as it was the first to inform the EU of the conspiracy. The Canadian antitrust authorities also prosecuted the defendants. Samsung and the other defendants reached a \$120 million settlement (\$40 million criminal fine, and \$80 million to be paid back to consumers who purchased related electronic devices).

80. Defendants were also named in prior civil litigation for their DRAM price-fixing conspiracy. In *In re Dynamic Random Access Memory (DRAM) Antitrust Litig.*, Master File No. M:02-cv-01486-PJH (N.D. Cal.), direct purchaser plaintiffs settled with defendants for over \$350 million, and indirect purchaser plaintiffs settled for over \$310 million.

## **VII. THE CONSPIRACY**

### **A. The Conspiracy: Defendants Engaged in a Price-Fixing Agreement and Signaling Through Public Statements and Action**

81. During the Class Period, Defendants engaged in and facilitated a price-fixing agreement with each other to delay, slow, or not to expand DRAM production capacity. This agreement and course of action allowed Defendants to increase DRAM prices, which had been steadily decreasing before the Class Period. Defendants were able to facilitate this price-fixing conspiracy through, *inter alia*, the use of public statements, such as press releases, media statements, and earning calls. These public statements, which deviated from their past business practices, allowed Defendants to keep engaged in the conspiracy, and to monitor each other's actions.

82. Through these public statements, Defendants were able to commit to collective supply discipline, despite the increased demand, and reaped huge profits during the Class Period.

83. During the Class Period, DRAM spot prices rose more than 300%, an event that

1 buckled the DRAM pricing trend preceding the Class Period.

2 84. Defendants' coordination of the conspiracy through public statements began in  
3 late 2015.

4 85. On November 17, 2015 at the UBS Global Technology Conference, Micron's  
5 Chief Financial Officer, Ernie Maddock announced to investors that the DRAM market was  
6 controlled by very few producers, and the market was protected by significant barriers to entry:  
7 "we do believe that from a market perspective, we're in an environment where you have closely  
8 held technology by a limited number of producers." Micron forecasted that its competitors would  
9 make some "really rational decisions" involving "lower supply growth" with "no significant  
10 DRAM capacity expansion."

11 86. In response to Maddock's announcement that Micron was going to restrict supply  
12 growth, on January 29, 2016 during its fourth quarter 2015 earnings call, Samsung stated that in  
13 2016, "we will be able to grow our supply, we're planning, at market growth levels. This year  
14 our main focus will be on profitability rather than increasing volume." Thus, it became apparent  
15 during the earnings call that Samsung's plan for 2016 deviated from its actions in 2015 where it  
16 had grown supply in an effort to take market share from its competitors.

17 87. On March 7, 2016 at the Raymond James Institutional Investors Conference,  
18 Micron's Maddock told investors that Micron's competitors have shifted their focus from  
19 competing for market share to instead focus on increasing profits: "So the question was that there  
20 are Taiwan or Korean entities bidding for share *i.e.*, causing our pricing environment to be  
21 different than it otherwise would be. You know, honestly we're not seeing that. ... So obviously  
22 if you have folks look to the Koreans and if you actually look at some of the public commentary  
23 that they have made with respect to the business environment they see, the focus on profitability  
24 and as we look at market behavior it is not consistent with any sort of deliberate attempt to take  
25 share, but so that's what we are seeing."

26 88. On March 30, 2016 at the second quarter of 2016 earnings call, Mark Durcan,  
27 Micron's CEO, in response to questions about potential supply restrictions, stated that Micron

1 would be willing to cut supply if its competitors also cut supply: “Q: Pricing is going to continue  
2 to be weak until Micron and the DRAM industry overall cuts production. So, I guess, my  
3 question is, what will it take for that to happen? A: We don’t have any plans that cut production  
4 to date. Q: I mean is your point that it’s got to come from the market share leader first? A: ... we  
5 think we’d be foolish to be the first ones to take capacity off.” Durcan further confirmed that  
6 Micron would not unilaterally cut production: “it’s a really ill-advised move to be unilaterally  
7 cutting production.” On the call, Durcan further emphasized that Micron would not try to take  
8 market share from its competitors: “Our focus isn’t on market share. Our focus is on making sure  
9 that we’ve deployed equivalent advanced technology, at least equivalent advanced technology to  
10 our competitor, so that we’re not incentivizing others to play for market share.” These public  
11 statements by Micron executives constituted a clear signal to Samsung and Hynix that while  
12 Micron would not unilaterally cut production, if either Samsung or Hynix were to do so, Micron  
13 would not compete on taking market share. These statements by Durcan also constituted a signal  
14 to Samsung and Hynix to cut down on supply.

15 89. Samsung, within a month, publicly responded to Micron’s invitation to cut  
16 production on its April 28, 2016 quarterly earnings call, stating that its bit growth was negative  
17 for the quarter. Samsung confirmed to an analyst that it was constraining supply increases and  
18 would grow at the same rate as competitors: “Q: It seems you have been continuously reducing  
19 your investments on the DRAM side. Could you provide your company's outlook on the DRAM  
20 growth for this year? A: We don't expect there to be major increases in supply of DRAM in the  
21 near future...in terms of full year 2016 DRAM shipment we expect to be in line with the market  
22 growth.”

23 90. On May 25, 2016 at the J.P. Morgan Global Technology, Media and Telecom  
24 Conference, Micron’s Durcan stated that supply growth for the next year would be around 20  
25 percent “as long as nobody adds any incremental DRAM wafers,” and that if “wafers actually  
26 come down as we're starting to hear some equipment suppliers talk about, then it could be mid-  
27 to high-teens, in which case that would be more beneficial.” Durcan explained that there are only

1 three suppliers in the market, and “we all are going to either benefit or be hurt by excess supply  
2 in the marketplace.” Durcan stated that he expected “slowing bit growth” in the industry and that  
3 he expected Micron and its competitors to maintain discipline: “there's a natural tightening  
4 tendency absent, somebody wanting to do something different than that. And so I'm – I actually  
5 remain bullish on the long term value, the DRAM business and the actions of the competitors in  
6 the marketplace.”

7 91. At the WSC 20th Anniversary Meeting in Seoul, Korea held on May 26, 2016,  
8 hundreds of CEOs and executives from global WSC members were in attendance. The  
9 conference was led by Hynix President and CEO, Sung Wook Park, and executives from  
10 Samsung and Micron were also in attendance. This conference provided an opportunity for  
11 Defendants' executives to communicate directly with each other on the price-fixing scheme.  
12 Shortly after this meeting, DRAM prices began to increase drastically despite relatively stable  
13 market conditions, such as demand.

14 92. On June 16, 2016 at the Nasdaq Investors Program Conference, Micron executive  
15 Ernie Maddock told investors that he expected Samsung and Hynix to continue restricting supply  
16 growth: “Q: The number of players in DRAM has gone down to three today as you mentioned,  
17 how concerned are you that in this new environment Samsung continues to be disruptive... A: ...  
18 this idea that there is a general reduction in DRAM CapEx planned by our Korean competitors  
19 and that we believe is very consistent with other messages that we're hearing in the marketplace.  
20 So am I concerned? We're always concerned. Do we believe that that [*sic*] disruptive behavior is  
21 a high likelihood? It just doesn't feel as if that's the case right now.”

22 93. From June through the end of 2016, DRAM prices increased by approximately  
23 50%. During this period, Defendants restrained their supply growth by avoiding adding  
24 significant wafer capacity. During the same period, Defendants, led by Micron, began to  
25 coordinate for 2017 on a plan of keeping supply growth below forecasted demand growth.

26 94. On July 21, 2016, during a second quarter earnings call, a Hynix representative  
27 stated that its bit growth for the year would be in the low to mid 20% range, which was in line

1 with market growth. Days later, on July 28, 2016, Samsung announced a very similar range for  
2 bit growth in 2016 during its quarterly earnings call.

3 95. At the Citi Global Technology Conference on September 8, 2016, Micron  
4 executives reaffirmed the industry consensus for DRAM bit growth as a figure approximated to be  
5 slightly under 20% which they described as “good” and characterized as a “really nice  
6 environment.” Micron emphasized that neither itself nor its competitors were adding wafers to  
7 increase available supply. Micron CFO Maddock reiterating public signals from Samsung and  
8 Hynix that they, like Micron, were not adding wafer capacity: “while I would love to tell you that  
9 our competitors have sent us a memo telling us what their expansion plans are, unfortunately I can't  
10 report that, but certainly we read the same thing that each of you read and it does suggest that the  
11 focus of capital spend in 2017 is going to be NAND as opposed to DRAM on the part of many  
12 folks in the competitors face. And as I mentioned, we would expect all of our bit growth to come  
13 from technology transition as opposed to any sort of wafer expansion. There have been some pretty  
14 dramatic things published which I won't repeat here relative to potentially what's going on with  
15 some of our competitors and how they're choosing to use their productive capacity, but there's no  
16 sign anywhere in the market that suggests there's a plan to expand DRAM wafer capacity.”  
17 Maddock also told investors that Micron had no plans to increase supply despite increasing  
18 demand: “Q: And it doesn't look like you guys are changing the supply side from Micron at all  
19 with the better demand, right? A: Well, I mean we have basically announced what we intend to  
20 do in terms of bit growth and we're sticking to that. And so it would have to be a very, very  
21 significant and profound belief that something had materially changed in the demand  
22 environment, I think, to cause us to reassess that CapEx plan in any significant way.”

23 96. On its October 4, 2016 fourth quarter earnings call, Micron reaffirmed the  
24 industry plan of keeping supply growth between 15-20% through minimal additions of wafers –  
25 even as demand growth was forecasted between 20-25%. Micron executive Durcan stated that  
26 “we’ve seen further evidence that DRAM wafer output is declining as a result of lost throughput  
27 related to the 20-nanometer and 1X nanometer conversions. Absent some replacement of these



1 wafers, we could see industry supply growth as low as mid-teens in 2017. As some of lost wafer  
2 output is replaced, industry supply growth could be in the high-teens percent range. This  
3 compares to our long-term bit demand growth forecast in the low to mid 20% range.”

4 97. On its October 27, 2016 quarterly earnings call, Samsung affirmed Micron’s  
5 public assessment of the market, aligning its own statements regarding supply and capacity plans  
6 in 2017 with Micron: “given the fact that we haven’t done much investments in DRAM this year,  
7 we are expecting our growth rates to come down, and be in line with market bit growth in  
8 DRAM next year.” Samsung told its investors that it would not try to compete for market share:  
9 “Once again, as we have always mentioned, regarding DRAM, our focus is not to increase our  
10 market share but to maximize our profits. And so our investments as well as production will also  
11 be flexibly managed according to how the market unfolds.”

12 98. As DRAM prices continued to drastically increase through the end of 2016 and  
13 into 2017, Defendants continued to make public statements about their commitments to capacity  
14 and supply discipline, and about the importance of maintaining capacity and supply discipline  
15 within the industry as a whole.

16 99. At the Credit Suisse Technology Media & Telecom Conference on November 29,  
17 2016, Micron executive Maddock reaffirmed the commitment of the entire DRAM industry to  
18 maintaining supply growth below 20% even as demand growth exceeded that rate: “I think a lot  
19 of that confidence goes back to the fundamental view of this supply and this demand. With no  
20 way for additions, we [think] that you are going to see this supply grow at something less than  
21 20%, and even with some room for error on the DRAM with demand side, we still see a number  
22 there north of 20%.” Micron was confident that the “industry will do pretty well . . . until we see  
23 announcements of new wafers.” Similar to Samsung, Micron also announced that it would not  
24 add supply in an attempt to compete for market share: “our objective is to close the gap [with our  
25 competitors] and make it as narrow as reasonable without doing anything that would potentially  
26 be disruptive to our performance or the industry’s performance.”

27 100. At the Barclays Technology Conference on December 7, 2016, Micron executive



1 Maddock stated that the absence of wafer capacity additions would allow Defendants to maintain  
2 supply growth at 15-20%, even as demand increased beyond that rate: “we continue to look at  
3 the longer term supply demand trends and in the absence of wafer additions by Micron or one of  
4 the other industry participants, we continue to see those as healthy because the technology  
5 transitions that we're going through yield progressively fewer incremental [bit]. So as we look at  
6 the supply side of the house, somewhat between 15% and 20% supply growth coming from these  
7 technology transitions and that is against a demand environment that we think is going to grow  
8 somewhere in the range of 20% to 25% on a [bit] basis.”

9 101. During Micron’s December 21, 2016 fourth quarter earnings call, Micron  
10 executive Durcan provided that Samsung had learned from its miscalculation in 2014 of adding  
11 supply capacity to meet strong demand and pricing, which was similar to the current situation  
12 that faced the industry: “Q: [Do] you have any comments on what is different between the  
13 previous cycle? A: Well I think that part of what happened in the last latter stages of the last  
14 cycle where perhaps a little bit a miscalculation by one of the suppliers, but that they probably  
15 learned from so there is that.” Despite rapidly rising prices, Durcan stated that Micron “had no  
16 plans to add new wafers this year” even though it had “some clean room space” that would allow  
17 it to add wafers. He further confirmed that Micron was closely monitoring competitors, including  
18 through the collection of ‘internal intelligence’ and expected that the industry would maintain its  
19 consensus of 15-20% supply growth without significant additions of wafers: “Q: you had  
20 mentioned around 15% to 20% bit supply growth in DRAM barring any additional supply from  
21 competitors. Can you talk a little bit about the – what you're seeing in terms of the transition to  
22 80 nanometer for some of your competitors? And is there risk in your mind in terms of additional  
23 supply coming online, any thoughts on that would be helpful. A: We don't have great crystal ball  
24 as to where our competitors are doing. We read the same reports that you guys read. All of that  
25 plus all the other internal intelligence we can generate that baked into our ranges and in the data  
26 sheet that we provided. So I think there has been some chatter recently potentially about few  
27 incremental wafers from one of the suppliers. Our view of that is if that were to happen, it's a

1 relatively minor adjustment in terms of the overall scope of the bit growth that we're projecting  
2 and it would probably not cause us to change that range that we've giving you."

3 102. At the Needham Growth Conference on January 10, 2017, Micron executive  
4 Maddock further signaled Micron's confidence that Samsung would not deviate from the  
5 understanding to restrict supply: "Q: Can you talk about [Samsung] and how rational...? A: ... I  
6 think their comments need to stand on their own and their comment seems to suggest a rational  
7 approach to addressing the supply/demand constraints of the DRAM market...the world is very  
8 different today than it was a few years ago..." Maddock reiterated Defendants' understanding to  
9 limit supply growth below demand: "Our review of the DRAM business is that there will be  
10 somewhere between 15% and 20% bit supply from Micron and all the other participants in the  
11 industry...we think demand is going to be...somewhere between 20% and 25%."

12 103. During its January 24, 2017 earnings call, Samsung reiterated it had no plans to  
13 add wafer capacity and would continue to constrain increases in DRAM supply: "Q: I'm a little  
14 bit surprised that Samsung is not looking to be a little bit more aggressive towards the capacity  
15 additions...If demand continues to be so strong and supply/demand balance remaining tight, is  
16 there some possibility that Samsung can actually boost capacity through the year and potentially  
17 beat those numbers, just like you did in 2016? A: And looking at the current market situation, we  
18 believe that we are able to cover the current market demand through our technology migration.  
19 So that is why we will be maintaining our operation flexibly and try to cover the market demand  
20 within our technology migration. So, given the size as well as the lead time necessary for  
21 increase of DRAM capacity, we believe that temporary increase of DRAM supply is not very  
22 easy."

23 104. On January 25, 2017, Hynix announced similar intentions—to restrict supply  
24 below demand while not competing for market share—as Micron and Samsung. Hynix  
25 executives stated that the company "believe[s] that throughout the first half of the year supply is  
26 not going to meet the demand which remains very strong" and that "the company is planning for  
27 a DRAM bit shipment growth that is on par with the market for this year." This course of action

1 would allow Hynix to “maximize profitability.”

2           105. Industry analysts from Sanford Bernstein noted the refusal of the Defendants to  
3 increase supply, even when faced with increasing demand. For example, in January 2017, the  
4 analysts provided that there was “tighter than expected supply/demand balance for the quarter,”  
5 and that “[they] expect this strong pricing environment (especially in DRAM) through mid-2017  
6 at least, as inventory levels are low and supply growth remains relatively muted in both DRAM  
7 and NAND. . . . With all players growing bits relatively modestly, [they] [did not] see any  
8 pricing collapse.” Goldman Sachs also forecasted in January 2017 that DRAM pricing would  
9 “increase further in 1H17, driven by a tight supply/demand balance” and that it believed “the  
10 leading DRAM maker, Samsung Electronics (SEC) [would] not become aggressive to gain  
11 market share in 2017 given that: (1) SEC’s management is likely to focus more on profitability  
12 rather than market share in DRAM due to structural margin pressure on its smartphone  
13 business.”

14           106. As Defendants’ prices and margins continued to increase, Micron executive  
15 Maddock reiterated on March 9, 2017 at a Susquehanna Semi, Storage & Technology Conference  
16 Call, that Micron had no “plan to add [DRAM] wafers in any form” and would not be attempting  
17 to increase its market share. Maddock also stated that its competitors were in agreement that they  
18 would not add capacity in an effort to take market share from each other: “But at the end of the  
19 day, it has typically not been Micron who has expanded industry capacity when the margin profile  
20 upgrade... all of the statements and all of the actions thus far suggest the things may indeed  
21 different in terms of how the participants are thinking about, the balance of profitability versus  
22 market share.” Maddock also stated that it would “provide maximum benefit to the Company” to  
23 be “public about the fact that we have no current plan to add wafer capacity.”

24           107. On March 23, 2017 during the 2017 second quarter earnings call, Micron  
25 executive Durcan reiterated that Micron and its competitors would continue to constrain and  
26 restrict supply growth in the face of steady demand: “We also see that the supply, as best we can  
27 tell, seems in control relative to demand. And I think, if you think about this cycle versus last

1 cycle, what you saw – what you saw last cycle was a big chunk of supply come off with the  
2 Hynix fire and the reaction with more supply to replace it and so maybe a little less stability than  
3 we're seeing this time around.” Durcan also told investors that Samsung’s behavior had deviated  
4 from previous cycles and that there was no reason for Samsung to lower the industry’s  
5 profitability by increasing wafer capacity: “Q: ...People are obviously worried about Samsung  
6 adding a bunch of wafers. Why would that not happen this time? ...But what's your base  
7 assumption for what the competition will do sort of in terms of bit growth this year? A: Again, I  
8 think the last cycle was a little different with that instability in supply created by the Hynix fire. I  
9 don't know why they would intentionally repeat the mistake from last cycle. They probably are  
10 enjoying making good margins... Samsung is actually probably on the low end over the next  
11 couple of years relative to what's going on in the industry as a whole. And the industry as a  
12 whole is probably a little bit south of where we think demand growth is.”

13 108. On a March 23, 2017 earnings call, Micron reiterated an industry-wide forecast of  
14 bit supply growth between 15-20% and demand growth between 20-25%: “It's still, in our view,  
15 it's 15% to 20% supply growth this year, could actually be less than that if there's less new  
16 wafers than we have in our plan. Demand is still 20% plus.” An investment analyst asked if  
17 Micron would increase wafer capacity because of “such strong pricing out there in the market.”  
18 Micron executive Durcan responded that Micron had the capacity to increase wafer production,  
19 but stated that Micron would not add supply, and maintaining the industry status quo: “We're not  
20 focused on adding more supply... We do have white space in both our Fab 16 in Taichung as  
21 well as Fab 10X, but we're not planning any capacity additions this year.”

22 109. On Hynix’s April 25, 2017 first quarter call, an investment analyst asked if Hynix  
23 had plans to increase its supply growth above the 20% rate that matched the supply growth range  
24 of Micron and Samsung. Hynix acknowledged that it had the capability to increase supply, but  
25 said it would continue the current projection of 20% growth for 2017: “Q: ...is there any  
26 possibility [for DRAM bit growth] to go higher than that 20% mark...? A: the current projection  
27 for about 20% level growth is also based on the assessment of...all of the factors”

1           110. During Samsung's April 27, 2017 earning call, Samsung again forecast that for  
2 2017 they "expect DRAM market bit growth to be high-teens and [they] expect to grow in line  
3 with the market." Samsung again reiterated that it would not increase wafer production capacity:  
4 "we have no plans of additional capacity." Samsung did note that it could change its DRAM  
5 capacity "depending on the market situation that unfolds."

6           111. On May 24, 2017, Micron executive Maddock reassured industry analysts at the  
7 JP Morgan Global Internet, Media and Technology Brokers Conference that Micron and its  
8 competitors – unlike previous years – were being careful not to add supply: "If you listen to the  
9 commentary coming from industry participants on the supply side it reflects a great deal of  
10 discipline and thoughtfulness with respect to how the industry participants are considering  
11 supply expansion... Although we don't speak for the industry, the other participants have spoken  
12 and indicated a great deal of discipline."

13           112. At the conference, Micron also announced that its supply growth matched those  
14 of its competitors and the industry supply growth of 15-20%: "On the DRAM side you're going  
15 to see somewhere between 15% and 20% growth in bits supplied, that's something that the other  
16 suppliers in the market are also saying, within reasonable range." Micron again emphasized it  
17 did not plan to not increase wafer production capacity in 2017, a strategic decision consistent  
18 with Samsung and Hynix: "Q: their view was, exiting this year, industry capacity is probably  
19 flat. And I don't know if you have a view on total industry capacity dynamics, and your sense of  
20 where that could be exiting this year? A: I think that's reasonably consistent with certainly what  
21 we've said about our intent, and then certainly the public comments of the other industry  
22 participants have been pretty much exactly that. That while you do get some wafer loss as a  
23 result of technology transitions, the intent that we have is to maintain flat wafer outs, so  
24 essentially you are adding a little bit of capacity to make up for those lost wafer outs, but as an  
25 industry as a whole, you are not adding substantial incremental industry wafers and that would  
26 contribute to or allow you to get into this 15% to 20% range in terms of bit growth."

27           113. On June 6, 2017, Micron executive Maddock again reiterated at the Bank of

1 America Merrill Lynch Global Technology Conference that the industry was systematically  
2 keeping supply growth constrained at 15-20% even as DRAM demand increased to 20-25%:  
3 “So, on DRAM, we have been saying for some time that we thought that from a demand  
4 perspective, that demand was going to be somewhere in the range of 20% to 25% year-on-year  
5 bit growth. And in fact, we feel that's a reasonable estimate to use for the next few years at least  
6 out as far as we would think about and model the business. And then from a supply side, we  
7 think that even with some very modest wafer additions by the industry essentially keeping wafer  
8 output flat in the face of declining bits coming simply from technology transition that aggregate  
9 bit growth from a supply point of view is going to be somewhere in the range of 15% to 20%.”  
10 Maddock emphasized that Micron, Samsung, and Hynix could maintain this supply shortfall if  
11 they remained disciplined: “It feels as very much as if you’ll have good balance between supply  
12 and demand as long as capital discipline is exercised. And certainly Micron has indicated the  
13 difference to be reasonably disciplined with its capital investments, and other industry  
14 competitors in their particular public disclosure have said similar things.” Micron’s comments  
15 suggested interdependent action where each of the three Defendants agreed not to add supply  
16 capacity despite rapidly increasing DRAM prices and demand: “Q: Maybe another way looking  
17 at the overall of the DRAM industry today's margins very high, so that could be sort of the  
18 temptation for your competitors because this is borrowing cost very low, right...don’t you expect  
19 any competitors tend to irrationally backing on the better, cyclical momentum? A: I can say our  
20 view of industry bit demand will have to be materially different than in the peers to be today to  
21 begin to have a think about expanding capacity well beyond where we are thinking today which  
22 is predominantly to get that capacity through technology transition... I don't think our view of  
23 how we look at the industry is very-very different then how other rational smart people sitting  
24 and other competitors tend to look at the industry.”

25 114. On June 8, 2017 at the Robert W. Baird Global, Consumer, Technology  
26 conference, Micron executive Maddock reaffirmed that Micron, Samsung, and Hynix did not  
27 plan on increasing wafer capacity despite rapidly rising DRAM prices: “[T]here has actually

1 been much more disciplined behavior on the part of the remaining industry participants, of which  
2 there are now only 3, it's Micron, Samsung and Hynix. And so while each of us is assessing the  
3 market, looking at the market, I think there's great consistency between suppliers relative to our  
4 view of market growth opportunities on the demand side. And what you see being exercised  
5 today is disciplined investment around expansion of capacity relative to expansion of demand.  
6 And each one of us has made our own independent comments on what we think makes sense for  
7 our particular company. In Micron's case, we said that we have no plans for additional new wafer  
8 fab capacity that we will get the bits that we require to serve the market from technology  
9 transitions.”

10 115. Throughout the quarter, DRAM prices continued to rapidly increase. However,  
11 the supply discipline understanding among the Defendants remained as they kept supply growth  
12 below demand growth, which only further fueled the price increases.

13 116. On its June 29, 2017 earnings call, Micron reaffirmed that the total DRAM  
14 industry bit growth “would be between 15-20%... below our view of demand growth” despite  
15 skyrocketing DRAM prices. Micron then reiterated that it had no plans to increase wafer  
16 capacity. When investors questioned whether Micron’s plan to limit supply growth would cause  
17 loss of market share, Micron responded: “we talked about our bit growth in context of an  
18 industry that we were estimating. But we also used the words at or slightly below, not materially  
19 below.”

20 117. On its July 25, 2017 earnings call, Hynix told investors that its DRAM shipment  
21 growth for the year would be “at low 20%, on par with the market.”

22 118. Two days later on July 27, 2017, Samsung announced that it too was forecasting  
23 its bit growth to be in the high teens, and that it expected its “bit growth to be in line with the  
24 market.” Samsung reassured investors that it would not disrupt the industry by increasing DRAM  
25 capacity in an attempt to gain market share: “Next year, we are considering possibly converting  
26 some of the NAND capacity to DRAM, but the actual timing or size of that will depend on the  
27 market situation that unfolds next year. As we have always emphasized in the conference calls,



1 we will refrain from, for example, increasing market share, fighting on volume. We manage our  
2 business with a profitability focus. And so, we will flexibly manage our capacity by very closely  
3 monitoring the market situation, as well as the supply and demand balance.” Samsung’s  
4 statements represent a change in behavior from its prior practice before the Class Period where  
5 they competed to gain market share by increasing supply.

6 119. Sanjay Mehrotra was appointed Micron CEO on May 8, 2017. After the public  
7 statements by Samsung and Micron, Mehrotra stated on August 7, 2017 at the KeyBanc Capital  
8 Markets Annual Global Technology Leadership Forum Conference that each of the three  
9 Defendants were taking the same, interdependent approach to bit supply growth by maintaining  
10 supply below demand: “Q: Have you -- either of you’ve seen any changes in the market with  
11 respect to recent commentary and related to what Samsung or Hynix said on the earnings calls in  
12 terms of bit supply that would be of any concern or CapEx plans that would be of any concern?  
13 A: I think overall bit supply in the industry is in 15% to 20% range. And when you look at the bit  
14 supply growth perhaps, may be little bit toward the higher end of that 15% to 20% range. But,  
15 the demand projection, again, from all the mega markets that I earlier talked about, point to  
16 greater than 20% demand for the industry. So, I do believe that for 2017 and heading into 2018  
17 as well, the industry fundamentals will be healthy.” Mehrotra also emphasized that Micron,  
18 Samsung, and Hynix controlled 95% of the DRAM market: “95% of the industry is supplied by  
19 three players, and Micron has a solid position in the DRAM industry. So, that’s a great position  
20 to be in.”

21 120. On September 6, 2017, Micron executive Maddock reassured investors at the Citi  
22 Global Technology Conference that industry consolidation over the last several years allowed  
23 Micron and its competitors to exercise mutual discipline over supply growth: “I do think  
24 consolidation has been very instrumental in having a disciplined and orderly expansion of  
25 supply. We have certainly seen that now over period of a couple of years and we expect based on  
26 everything that we can see that you're going to continue to have a disciplined expansion of  
27 supply as we look forward into fiscal '18 for Micron.” Maddock emphasized a shared, publicly



1 stated desire among Micron, Samsung, and Hynix to keep wafer capacity flat: “if you listen to  
2 the public commentary of the industry participants, the key message across the Board is that the  
3 investments are mainly for technology transition with the desire to keep wafer starts roughly  
4 flat.” Maddock made it clear that keeping wafer capacity flat would allow Micron, Samsung, and  
5 Hynix to keep supply growth below demand growth: “this will allow the industry to grow bits at  
6 this 20% plus or minus range over the course of any given year and certainly that feels very well  
7 matched to what we believe the demand to grow from a supply point of view, which is in the  
8 20% to 25% range.”

9 121. On a September 27, 2017 earnings call, Micron reassured investors that it  
10 expected the DRAM “industry to remain moderately undersupplied for the rest of 2017.” Micron  
11 executive Maddock told investors that Micron would not grow its supply capacity faster than that  
12 of industry participants, thus preserving the industry status quo: “Q: [A]t what point, do you  
13 think you begin to start to outgrow bits relative to the industry for [DRAM]? A: I would also tell  
14 you that our objective over a multiyear period is to grow at about industry levels... really  
15 important is the segment that we intend to grow aligned with industry over the course of these  
16 multiyear periods.” Despite undersupply in the DRAM market, Micron stated that it intended for  
17 its DRAM bit growth for 2018 to “be slightly below the industry growth rate.”

18 122. On an October 16, 2017 earnings call, Hynix also stated that the DRAM market  
19 was in a state of undersupply and that it did not plan on increasing wafer capacity to cure the  
20 undersupply in the market. Hynix also informed investors that it intended to grow its DRAM  
21 capacity in 2018 in line with the market.

22 123. Samsung, on an October 31, 2017 earnings call, told investors it was actually  
23 adding less DRAM capacity than previously planned despite rapidly rising prices because “our  
24 basic approach to DRAM capacity management is that we will flexibly manage our capacity  
25 especially depending on the market situation for each product.” Samsung emphasized that for the  
26 year, Samsung’s DRAM bit growth for the year had been below the industry, stating that “2017  
27 market DRAM bit growth will be approximately 20% and our bit growth will be mid-teens.”

1 124. Throughout this period, Samsung had the highest market share in the DRAM  
2 industry. Richard Posner, a highly regarded judge and economist, recognized that “declining  
3 market shares of leaders” is a plus factor potentially indicative of cartel conduct. Samsung  
4 acknowledged on October 31, 2017 that it had lost market share during the year, but stated that it  
5 would not seek to regain market share by increasing supply more rapidly than the market: “Q:  
6 this is the first time that Samsung Electronics has lost market share in DRAM? Does it plan to  
7 regain its previous market share next year or will you be more trying to maintain where you  
8 stand currently? A: It's a bit too early for us to give you specifics about what we plan to do with  
9 DRAM, but the current guidance that we can give you is that for next year, our bit growth for  
10 DRAM is expected to be at market growth levels.”

11 125. Throughout most of 2017, Defendants strongly assured investors that each of the  
12 Defendants was taking the same approach. Even as DRAM prices continued to rise throughout  
13 2017, Defendants kept to their common scheme of not adding wafer capacity even though each  
14 had space to add such supply to meet the strong demand.

15 126. On November 28, 2017 at the Credit Suisse Annual Technology, Media &  
16 Telecom Conference, Micron executive Mehrotra reaffirmed the industry-wide approach of not  
17 adding significant wafer capacity and keeping supply growth below demand growth: “For fiscal  
18 year '18, what we have said is, industry supply that growth 20%...while the demand trends I  
19 believe will continue to be somewhat stronger than that...there may be some wafer capacity  
20 additions [in the industry] but they will remain relatively small.”

21 127. Micron executive Maddock confirmed on December 6, 2017 at the Nasdaq  
22 Investor Conference that the industry planned to keep wafer capacity flat for several years  
23 despite rapidly rising DRAM prices: “We are not adding wafers for either technology in 2017. I  
24 think if you look at the public comments of other suppliers they are adding marginal numbers of  
25 wafers. But essentially if you look at the industry in aggregate even at the end of 2018 it's  
26 altogether possible for DRAM that the number of wafers the industry produces is the same or  
27 slightly less than it was some years ago.” Maddock further stated that Micron and its competitors

1 shared a common agreement to constrain DRAM supply: “if you look at the public commentary  
2 of all the industry participants...I think there is a general belief that the industry participants are  
3 keenly aware of the fact that the DRAM market is relatively inelastic and the way you serve that  
4 market is by making sure there is adequate, but not excess supply.”

5 128. DRAM prices continued to climb, and then abruptly stopped in early 2018, just  
6 after China’s antitrust regulator, the NDRC, announced that it had begun an investigation into the  
7 DRAM industry due to the noticeable and sharp rise in the price of DRAM over the 18-month  
8 period from June 2016 to December 2017.

9 129. On February 1, 2018, it was reported that the NDRC and Samsung signed a  
10 Memorandum of Understanding that would result in moderations to the price increases of  
11 DRAM in 2018.

12 130. In April 2018, Hynix publicly announced that it was adding wafer capacity by 6-  
13 7% per year in order to meet demand growth. This addition of wafer capacity was a change in  
14 practice from the Class Period where the Defendants artificially constrained the growth of wafer  
15 capacity in order to inflate the price of DRAM.

16 **B. Chinese Antitrust Investigation**

17 131. Beginning in December 2017, the Chinese government opened an investigation  
18 into the pricing strategies of Micron, Samsung, and Hynix for DRAM products to investigate  
19 potential antitrust violations. As part of its antitrust probe of the DRAM market, China’s  
20 National Development and Reform Commission (“NDRC”) interviewed Samsung after Samsung  
21 raised its DRAM prices for a sixth straight quarter, and China’s Anti-Monopoly Bureau of  
22 Ministry of Commerce met with Micron to “express concerns” about continued price increases  
23 for DRAM products. NDRC official, Xu Xinyu, said “We have noticed the price surge and will  
24 pay more attention to future problems that may be caused by ‘price fixing’ in the sector.”

25 132. On February 1, 2018, the NDRC and Samsung reportedly entered into a  
26 Memorandum of Understanding where Samsung agreed to increase its DRAM manufacturing  
27 and supply.

133. It has been reported that in May 2018, Micron was summoned by Chinese antitrust authorities to a meeting, possibly to discuss its DRAM pricing practices.

134. Most recently, on May 31 2018, Bloomberg reported that Chinese antitrust investigators raided Micron, Samsung, and Hynix's offices in connection with their DRAM antitrust investigation. The Chinese government's investigation remains ongoing.

### **VIII. ANTITRUST INJURY**

135. Defendants' conspiracy caused injury to Plaintiff and members of the Class by suppressing price competition among DRAM manufacturers, thereby depriving all direct purchasers of DRAM of the benefits of a competitive market, and resulting in the setting of prices of DRAM at artificially high levels.

136. As a direct result of the conspiracy, Plaintiff and members of the Class have been injured in their business or property in that they paid more for DRAM than they would have paid in a competitive market.

137. Defendants and their co-conspirators knew and intended that their pricing actions regarding their sales of DRAM would have a direct impact on prices for DRAM for all direct purchasers of DRAM throughout the United States.

### **IX. CLAIM FOR RELIEF**

#### **CAUSE OF ACTION—VIOLATIONS of SHERMAN ACT § 1**

138. Plaintiff incorporates and re-alleges each allegation set forth in the preceding paragraphs of this Complaint.

139. Beginning at the latest June 1, 2016, and continuing through at least February 1, 2018, Defendants and their co-conspirators, by and through their officers, directors, employees, agents or other representatives, engaged in anticompetitive activities, the purpose and effect of which were to artificially raise, fix, maintain, or stabilize the price of DRAM sold in the United States, in violation of Section 1 of the Sherman Act, 15 U.S.C. § 1.

140. Defendants entered into a continuing agreement, understanding and conspiracy in restraint of trade to artificially raise, fix, maintain or stabilize prices for DRAM in the United

1 States.

2 141. Plaintiff and the other Class members have been injured in their business and  
 3 property by reason of Defendants' unlawful combination, contract, conspiracy and agreement.  
 4 Plaintiff and Class members paid more for DRAM than they otherwise would have paid in the  
 5 absence of Defendants' conduct. This injury is of the type the federal antitrust laws were  
 6 designed to prevent and flows from that which makes Defendants' conduct unlawful.

7 142. Accordingly, Plaintiff and Class members seek damages, to be trebled pursuant to  
 8 federal antitrust law, and costs of suit, including reasonable attorneys' fees.

9 **X. PRAYER FOR RELIEF**

10 143. Wherefore, Plaintiff demands judgment against Defendants as follows:

- 11 a. Declaring this action to be a proper class action pursuant to Rule 23(a) and  
 12 (b)(3) of the Federal Rules of Civil Procedure on behalf of the Class as  
 13 defined herein;
- 14 b. That the contract, combination, or conspiracy, and the acts done in  
 15 furtherance thereof by Defendants be adjudged to have violated Section 1  
 16 of the Sherman Act, 15 U.S.C. § 1;
- 17 c. That judgment be entered for Plaintiff and Class members against  
 18 Defendants for three times the amount of damages sustained by Plaintiff  
 19 and the Class as allowed by law;
- 20 d. That Plaintiff and the Class recover pre-judgment and post-judgment  
 21 interest as permitted by law;
- 22 e. That Plaintiff and the Class recover their costs of the suit, including  
 23 attorneys' fees, as provided by law; and
- 24 f. For such other and further relief as is just and proper under the  
 25 circumstances.

**XI. DEMAND FOR JURY TRIAL**

Pursuant to Rule 38(b) of the Federal Rules of Civil Procedure, Plaintiff demands a jury trial as to all issues triable by a jury.

Dated: June 28, 2018

Respectfully submitted,

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**ATTESTATION**

I, R. Alexander Saveri, hereby attest, pursuant to Civil Local Rule 5-1(i)(3), that  
concurrence in the filing of this document has been obtained from all signatories

/s/ R. Alexander Saveri  
R. Alexander Saveri